

### IN THE CLAIMS

The Claims are not being amended.

1. (PREVIOUSLY AMENDED) A process for the structuring of a cheese portion comprising:
  - providing portions of curd or cheese in segments of a first average dimension and having a total surface area,
  - adding to said segments a composition comprising transglutaminase to at least five percent of said total surface area of said segments, said composition providing a bonding-sufficient amount of transglutaminase to said total surface area,
  - pressing said portions together, while the bonding-sufficient amount of transglutaminase to said total surface area of the curd or cheese segments is present on the surface of the curd or cheese segments, to eliminate air between said portions while forming a volume of curds or cheese that is larger than [an] a single portion of said portions of curds or cheese,
  - allowing said transglutaminase to bond said portions of curds or cheese together to form a unit of cheese.
2. (ORIGINAL) The process of claim 1 wherein said composition comprises transglutaminase in the presence of less than a 1:1 weight ratio of casein or caseinate to transglutaminase.
3. (PREVIOUSLY AMENDED) The process of claim 1 wherein said composition comprises transglutaminase with less than 10% by weight of said transglutaminase composition with respect to cheese protein.
4. (ORIGINAL) The process according to claim 1 wherein said transglutaminase is provided to the curds or cheese in an amount of about 0.01-10.0 units per gram of cheese protein.

5. (ORIGINAL) The process of claim 4 wherein the time in which said curds or cheese is allowed to bond is in the range of about 10-80 hours at a temperature is between 40°F and 125°F.
6. (ORIGINAL) The process according to claim 2 wherein said transglutaminase is provided as a solid mixture of transglutaminase and inorganic filler at a concentration in the range of about 0.02-5 units of transglutaminase per gram of curds or cheese protein.
7. (PREVIOUSLY AMENDED) A process for the structuring of a cheese portion comprising:
  - breaking a single curd portion having a weight of between 2 and 40 kilograms into smaller segments of curd;
  - adding a composition comprising transglutaminase to said smaller segments of curd in an amount of transglutaminase sufficient to chemically bond said smaller segments of curd together,
  - pressing said segments of curd together, while the amount of transglutaminase to said total surface area of the curd or cheese segments is present on the surface of the curd segments to eliminate air between said segments while forming a volume of curds that is larger than 50 kilograms, and
  - allowing said transglutaminase to bond said segments of curds together.
8. (ORIGINAL) The process of claim 7 wherein said allowing said transglutaminase to bond said segments of curds together is performed for at least two hours at a temperature between 40°F and 125°F.
9. (ORIGINAL) The process of claim 8 wherein said segments of curd cure to form cheese during said allowing said transglutaminase to bond said segments of curds together.
10. (ORIGINAL) The process of claim 7 wherein said transglutaminase is

added as a solid composition to said smaller segments of curds.

11. (ORIGINAL) The process of claim 10 wherein said solid composition of transglutaminase comprises as a mixture of transglutaminase and inorganic solid.

12. (ORIGINAL) The process of claim 7 wherein transglutaminase is added to said smaller segments of curd in an amount of 0.001 to 0.5% by weight of transglutaminase to said smaller curd segments.

13. (ORIGINAL) The process of claim 12 wherein said transglutaminase is added to said smaller curd segments by a physical process including at least one step selected from the group consisting of tumbling, stirring, agitation, spraying, stirring, and shaking.

14. (PREVIOUSLY CANCELLED)

15. The process of claim 7 wherein said composition comprising transglutaminase comprises transglutaminase in an aqueous carrier, and the composition is free of ingredients that will chemically bond with said transglutaminase.

16. The process of claim 12 wherein said smaller segments of curd are chemically bonded by said transglutaminase reacting solely with protein in said smaller curd segments.

17. (PREVIOUSLY ADDED) A process for the structuring of a cheese portion comprising the following steps in sequence:

- a) providing portions of curd or cheese in segments of a first average dimension and having a total surface area,
- b) adding a composition comprising transglutaminase to at least five percent of said total surface area of the curd or cheese

- segments, said composition providing a bonding-sufficient amount of transglutaminase to said total surface area of the curd or cheese segments,
- c) pressing said portions together to eliminate air between said portions while 1) a bonding-sufficient amount of transglutaminase to said total surface area of the curd or cheese segments is present on the surface of the curd or cheese segments, and 2) forming a volume of curds or cheese that is larger than a single portion of said portions of curds or cheese, and
  - d) allowing said transglutaminase to bond said portions of curds or cheese together to form a unit of cheese while the bonding-sufficient amount of transglutaminase to said total surface area of the curd or cheese segments is present on the surface of the curd or cheese segments.

18. (PREVIOUSLY ADDED) The process of claim 17 wherein said allowing said transglutaminase to bond said segments of curds together is performed for at least two hours at a temperature between 40°F and 125°F.

### **SUMMARY OF THE REJECTION**

Claims 1-13 and 15-18 are rejected under 35 USC 102(b) As Anticipated by Kuraishi et al., U.S. Patent No. 5,681,598

It is asserted that U.S. Patent No. 5,681,598 (Kuraishi et al.) teaches a process for producing cheese using transglutaminase after cheese formation, and using the transglutaminase in the amounts claimed.

### **RESPONSE TO THE REJECTION**

The rejection under 35 USC 102(b) over Kuraishi et al. is respectfully traversed. The fundamental difference between the practice of the invention and the disclosure of Kuraishi with regard to the use of transglutaminase (TG) may be summarized in the Table below the following comments.

#### **Response to the Examiner's Comments**

It is to be noted that the Examiner has asserted that the only difference between the present invention and that of Kuraishi et al. is the size of the surface area to which the transglutaminase is applied. This is clearly in error when the above comparison is reviewed. The intent of the processes are different, and the relative proportions of materials are significantly different. Where Kuraishi et al. are using the transglutaminase before pressing and after washing, the present claims require that the transglutaminase be present during pressing. This is essentially impossible with Kuraishi et al. where the small curds are washed before further processing. These are substantive differences not anticipated by Kuraishi et al. which have not been addressed in the response.

<b>Kuraishi Process</b>	<b>Claimed Process</b>	<b>Comments</b>
Curd is cooked and stirred in aqueous system in presence of TG (column 7, lines 7-34)	Solid curd segments are coated with transglutaminase.	The invention process places TG on curd surface rather than being imbibed in curd
Liquid (including TG) is drained from curd, reducing concentration of TG	TG must remain on curd segments during process in applied concentration	Removal of TG removes bonding capability of TG on curd segments
Curd subsequently cut again after TG treatment and drainage of liquid with TG therein	Curd segments are pressed in presence of TG	Recutting removes Tg from surface during subsequent pressing process

Pressing is done after TG has reacted and after residual TG drained with whey	Pressing must be done in presence of TG to effect bonding	TG cannot bond segments during pressing in Kuraishi as the TG has been removed or reacted
The weight gain in Kuraishi (column 7) appears to be due to reaction of curd with protein in other material in the aqueous matter. There is no bonding of solids with TG to form smooth cheese form	The TG bonds cheese curd segments together at the surface of adjacent curds. The TG must be present during pressing to effect the smooth bond	There is little (less than recited amount) of TG present on surface of curd segments in Kuraishi during pressing step. TG liquid drained, and curd recut to expose new surfaces before draining.

As can be seen from this side-by-side comparison, there are substantial and fundamental differences between the invention as claimed by Applicant and the disclosure of Kuraishi. There is no intention or inherent use of transglutaminase (TG) by Kuraishi to bond segments of curd protein. The treatment by Kuraishi reacts the TG well before pressing, drains TG from the mass prior to pressing, cuts the intermediate curd before pressing, and does not add TG to coat the cut surface of the TG before pressing.

Both the original claims (and as amended) and the new claims 17-18 clearly recite that the transglutaminase must be present on the surface of the curd or cheese segments during pressing, and that the TG effects bonding between the segments. These steps are not possible in the practice of the Kuraishi process. As noted above, the curd is stirred and heated in the presence of TG, bonding the TG to surfaces, without bonding segments together. The liquid, along with any residual TG, is then drained from the curd mass. The curd mass, after draining, but without pressing, is then cut again into smaller pieces and further drained. The drained smaller segments are then milled (broken into small pieces again), mixed with salt, and then pressed. This process clearly does not and cannot provide TG on the surface of curd segments in the concentration required at the time of pressing. Kuraishi clearly does not anticipate the invention as claimed.

It is equally obvious that the purpose of the addition of the TG in the process of Kuraishi is to build up mass that cannot be drained during initial steps, and that the TG serves no purpose after formation of the original curd mass (that

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Grindstaff et al. Examiner: Leslie Wong  
Serial No. 09/770,031 Group Art Unit: 1761  
Filed: January 25, 2001 Docket No. 707.001US1  
Title: SHAPED CHEESE RECONSTRUCTION WITH TRANSGLUTAMINASE

The undersigned hereby certifies that this Transmittal Letter and the paper, as described herein, are being faxed to the United States Patent and Trademark Office Addressed to MAIL STOP: AF, PO BOX 1450, Commissioner for Patents, Alexandria, VA 22313-1450 on August 11, 2003.

Mark A. Litman  
Name

Signature 

**PETITION FOR EXTENSION OF TIME  
UNDER 37 C.F.R. §1.136(a)**

**MAIL STOP: AF  
P.O. BOX 1450  
Commissioner for Patents  
Alexandria, VA 22313-1450**

Dear Sir:

This is a request under 37 C.F.R. §1.136(a) to extend the period for filing a response to the Office Action dated April 11, 2003. This is a request for a 1-month extension of time from July 11, 2003, to August 11, 2003. The required fee for this extension of time, the amount of \$55.00 (small entity applies), is hereby authorized to be withdrawn from Deposit Account Number 50-1391.

Please consider this a petition to extend the time to respond if an additional extension of time is deemed necessary by the Office. Authorization is hereby given to charge Deposit Account Number 50-1391 if such additional extension is necessary.

Respectfully submitted,

DONALD GRINDSTAFF, et al.

By Their Representatives,

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Date: 11 August 2003

By: 

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